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Evaluating the Effects of Simulated Golf Cart Traffic on Dormant Buffalograss and Turfgrass Colorants

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Evaluating the Effects of Simulated Golf Cart Traffic on Dormant Buffalograss and Turfgrass Colorants

Abstract

Percent green cover will ultimately decrease over time when traffic is applied to dormant buffalograss with turfgrass colorants. Data suggests that an additional five weeks of acceptable green cover can be achieved under high traffic situations when Endurant Premium is applied to dormant turf.

Keywords

traffic, Buffalograss, turfgrass

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Evaluating the Effects of Simulated Golf Cart Traffic on Dormant Buffalograss and Turfgrass Colorants

Evan Alderman, Jared Hoyle, Jack Fry, and Steven Keeley

Summary. Percent green cover will ultimately decrease over time when traffic is applied to dormant buffalograss with turfgrass colorants. Data suggest that an additional five weeks of acceptable green cover can be achieved under high traffic situations when Endurant Premium is applied to dormant turf.

Rationale. Buffalograss [*Buchloe dactyloides* (Nutt.) Engelm] is a low maintenance turfgrass species that has the ability to survive in low input turfgrass systems due to low fertility and irrigation requirements. Although buffalograss is well adapted to the summer months in the transition zone, its prolonged dormancy period is of concern. Turfgrass colorants have been used on various warm-season species to paint the turf green during winter dormancy. Furthermore, dormant turf many also be susceptible to injury from golf cart traffic. Minimal information is currently available on the interaction of golf cart traffic on turfgrass colorant longevity and dormant buffalograss recovery, therefore, further research is needed.

Objectives. Investigate turfgrass colorant longevity and also buffalograss tolerance and recovery when subjected to simulated golf cart traffic.

Study Description. A field study was initiated September 14, 2014 at the Rocky Ford Turfgrass Research Center in Manhattan, KS on 'Cody' buffalograss mown at 0.625 inches. The study was conducted as a strip-plot design, with a 4 × 5 factorial treatment structure, with four replications. Factors consisted of traffic rates: 0, 2, 4, and 8 passes/week and winter color: no colorant, Green Lawnger (GL), Endurant (E), Endurant Premium (EP), and Perennial Ryegrass [*Lolium perenne* L.] (PR).

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The PR treatment was overseeded into the buffalograss at trial initiation at a rate of 10 lb/1,000 ft^2 with Champion GQ perennial ryegrass blend. Turfgrass colorants were applied on October 24, 2014 with a CO_2 hand-held boom sprayer at 43 gal/acre with colorants mix at a 1:6 colorant to water ratio. At 24 weeks after colorant application (WAC), the overseeded PR was sprayed out with flazasulfuron (Katana) at 0.034 oz/1,000 ft^2. Digital images were collected and subjected to digital image analysis in SigmaScan (Hue: 50-107, Saturation: 0-100) to determine percent winter green cover. Statistical analysis was performed using the Proc Glimmix procedure in SAS, means were separated using Fisher's Protected LSD test when $P \leq 0.05$.

Results. A significant interaction between traffic rate and winter green cover was observed 4 – 24 WAC. Overall, colorant longevity decreased as traffic rate increased. Four WAC 8 passes/week for no paint; GL, E, EP, and PR resulted in 1.60%, 8.87%, 9.47%, 64.26%, and 61.20%, green cover, respectively. Endurant premium turfgrass colorant performed best during this study, sustaining higher than 50% green cover until five WAC under the highest traffic treatment, and 10 WAC under the lowest traffic treatment. Regardless of traffic treatment at 34 WAC, plots receiving colorant treatments had all recovered to at least 49% green turf cover.

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Table 1. Mean separation of the interaction between winter color and simulated golf cart traffic rate on the response of digital percent green cover

		Digital % green cover†					
Winter color	Traffic rate	-1 WAC‡	0 WAC	6 WAC	12 WAC	24 WAC	34 WAC
Perennial Ryegrass	0 passes/week	96.09	96.81	56.89 b§	26.89 de	73.48 a	9.96
	2 passes/week	96.63	96.88	46.33 cd	15.53 fgh	70.99 a	10.77
	4 passes/week	95.18	95.54	34.61 e	9.51 fghi	69.41 ab	12.48
	8 passes/week	95.27	94.97	30.00 ef	5.71 hi	60.64 b	16.27
Endurant Premium	0 passes/week	27.55	95.47	79.07 a	75.06 a	59.91 b	51.94
	2 passes/week	28.88	96.35	53.15 bc	53.52 b	38.21 c	51.20
	4 passes/week	29.81	94.22	38.60 de	39.65 c	32.45 cdef	49.29
	8 passes/week	32.84	96.64	30.42 ef	36.53 cd	22.89 ghi	58.61
Endurant	0 passes/week	25.25	70.76	16.94 gh	18.86 efg	36.44 cd	53.42
	2 passes/week	31.37	68.18	7.67 hi	8.62 hi	28.31 defg	50.85
	4 passes/week	24.88	72.92	4.11 i	5.40 hi	26.07 efghi	53.73
	8 passes/week	29.31	72.88	3.50 i	3.94 hi	20.83 ghi	56.30
Green Lawnger	0 passes/week	29.03	70.90	20.74 fg	20.38 ef	34.20 cde	56.53
	2 passes/week	31.13	69.93	8.50 hi	9.33 ghi	27.14 defgh	49.02
	4 passes/week	30.34	70.37	6.05 hi	6.63 hi	22.45 ghi	57.58
	8 passes/week	32.82	74.63	2.57 i	3.40 i	17.66 i	57.56
No paint	0 passes/week	30.10	33.79	2.65 i	3.87 i	19.80 ghi	52.69
	2 passes/week	30.99	30.20	0.99 i	1.42 i	20.44 ghi	53.56
	4 passes/week	32.19	31.29	1.05 i	1.91 i	23.66 fghi	55.69
	8 passes/week	35.26	33.82	0.85 i	1.16 i	17.71 hi	58.41

† Digital percent green cover was evaluated in SigmaScan (Hue: 50-107, Saturation: 0-100) using digital images taken with a camera light box. Evaluations were on a 0-100% scale where 0% = no green cover, and 100% = complete green cover in the image.
‡ Indicates weeks after colorant application. Values corresponding to -1 WAC were taken immediately prior to colorant application.
§ Means in a column with like letters are not determined to be statistically different according to Fisher's protected LSD test, ($P \leq 0.05$).

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Figure 1. Digital images of no paint, Endurant Premium, and Perennial Ryegrass treatments 10 WAI at 0 and 8 passes/week.

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